

Effect of spacing and fertilizer on medium duration rice (*Oryza sativa*) varieties

M. R. H. SIDDIQUI¹, R. LAKPALE² AND R. S. TRIPATHI

Department of Agronomy, Indira Gandhi Krishi Vishwavidyalaya, Raipur,
Madhya Pradesh 492 012

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ABSTRACT

A field experiment was conducted during *kharif* 1995 and 1996 at Raipur (M.P.) to find out the effect of spacing and fertilizer level on medium duration rice varieties. The grain yield of rice under closer spacing (10 × 10 cm) was significantly superior over wider spacing (20 × 10 cm). Higher fertilizer level (120 : 60 : 40 kg N : P₂O₅ : K₂O/ha) produced significantly more grain yield compared with low fertility level (80 : 50 : 30 kg N : P₂O₅ : K₂O). A newly released variety 'Mahamaya' performed significantly superior over other tested varieties.

Key words: Spacing, Fertility, Rice varieties, Yield

The genetic potential of any variety cannot be fully explored without proper agronomic management practices. A suitable agro-technique is required particularly for different newly released/pre-released varieties for exploiting their genetic potential to produce maximum yield. Plant spacing of wetland bunded rice crop is an important factor to exploit the potential of the high yielding improved variety (Paraye *et al.*, 1996). In addition, N fertilization and suitable genotype are the important factors for successful production of rice (Bali *et al.*, 1995). Therefore, this study was conducted to find out the optimum plant spacing and fertilizer level to obtain maximum yield from mid-duration rice varieties under trans-

planted condition.

MATERIALS AND METHODS

A field experiment was conducted at Raipur during *kharif* 1995 and 1996. The soil was clay loam in texture having 205, 16.5 and 140 kg/ha available N, P and K respectively. Seedlings of 30 days age were transplanted in 3rd week of July. The treatments comprising 2 spacings (20 × 10 cm and 10 × 10 cm), 2 fertilizer levels (80 : 50 : 30 and 120 : 60 : 40 kg N : P₂O₅ : K₂O/ha) and 4 promising medium duration varieties ('Mahamaya', 'Kranti', 'R-296-260' and 'Suraksha') were laid out in randomised block design with 3 replications. Full dose of P and K and 30% of N was applied at trans-

Present address: ¹Directorate of Extension Services, IGKV, Raipur. ²Krishi Vigyan Kendra, Badgaon, Balagaht (Madhya Pradesh)

Table 1. Effect of spacing and fertilizer on medium duration rice varieties

Treatment	Plant height (cm)		Effective tiller/plant		Panicle length (cm)		Panicle weight (g)		Grains/ panicle		Straw yield (q/ha)		Grain yield q/ha	
	1995	1996	1995	1996	1995	1996	1995	1996	1995	1996	1995	1996	1995	1996
<i>Spacing</i>														
20 × 10	102	96	219	240	22.5	21.7	3.16	3.19	112	103	73.50	57.67	60.02	57.43
10 × 10	101	93	266	296	21.9	21.1	3.01	3.00	100	90	78.08	69.68	68.85	62.25
CD (P = 0.05)	NS	1.4	9.7	8.3	NS	0.4	NS	0.07	10.5	3.2	3.0	2.41	1.06	1.77
<i>N : P₂O₅ : K₂O (kg/ha)</i>														
80 : 50 : 30	98	94	247	255	22.2	21.1	3.14	2.98	110	97	68.45	57.67	60.10	56.63
120 : 60 : 40	106	96	239	282	22.2	21.7	3.03	3.21	102	96	83.12	69.68	68.77	63.25
CD (P = 0.05)	3.0	1.4	NS	8.3	NS	0.4	NS	0.07	NS	NS	3.07	2.41	5.29	1.77
<i>Variety</i>														
'Mahamaya'	100	97	241	260	21.7	20.7	3.02	3.33	97	99	73.12	68.47	70.71	67.50
'Karanti'	99	99	238	267	21.2	19.3	3.16	3.22	104	104	73.92	67.49	60.46	63.79
'R 296-260'	98	97	232	276	21.5	24.1	3.04	3.15	102	106	76.21	64.33	61.37	56.37
'Suraksha'	110	86	260	271	24.4	21.4	3.12	2.68	120	81	81.92	54.39	61.21	51.70
CD (P = 0.05)	4.2	1.9	13.6	11.8	1.03	0.62	NS	0.11	14.9	4.5	4.34	3.41	7.48	2.50

planting as basal dose and 40% N was applied 30 DAT and remaining 30% N was applied at panicle initiation stage.

RESULTS AND DISCUSSION

Spacing

Results revealed that effective tillers were significantly more in closer spacing (10×10 cm). The closer spacing (10×10 cm) produced significantly higher grain yield over wider spacing (20×10 cm) (Table 1). Wagh and Thorat (1987), Gupta and Sharma (1991) and Paraye *et al.* (1996) also reported that crop transplanted at closer spacing recorded significantly higher yield.

Fertilizer level

Fertiliser level had significant influence on plant height and effective tillers. The plant height and effective tillers were significantly more with higher fertilizer level (120: 60: 40 kg N: P_2O_5 : K_2O /ha), which also produced significantly higher grain yield compared with lower fertility level (80: 50: 30 kg N: P_2O_5 : K_2O /ha) (Table 1). Wagh and Thorat (1987), Gupta and Sharma (1991), Bali *et al.* (1995) and Paraye *et al.* (1996) also reported similar findings. It indicated that high yield potential variety needs more quantity of nutrients to produce maximum grain yield.

Variety

Varietal variation was significant in yield attributes and yield during both the years. A significantly higher grain yield was recorded with cv. 'Mahamaya' in both the years (Table 1). This could be attributed to its better growth and yield attributes (plant height, effective tillers and heavier panicle) (Table 1). The grain yield of other 3 varieties was on par in 1995, while these were in the following order in 1996: 'Kranti' > 'R-296-260' > 'Suraksha'.

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